

COMPARATIVE STUDY OF PHYSICO-CHEMICAL PROPERTIES OF COCONUT SEEDS DURING STORAGE AT DIFFERENT TEMPERATURES AND HUMIDITIES.

1. DR. PUJA KUMARI

2. DR. RAMESH KUMAR

DEPT. OF BOTANY, P. Sc. COLLEGE, MADHEPURA.

ABSTRACT :

In the current work attempt has been made on the comparative studies of physico-chemical properties of coconut seeds during their storage with different temperatures and relative humidities. The physico-chemical characteristics of the seeds are found to depend on the condition of storage including storage, relative humidity, temperature, container of storage, season of storage, microbial and pest invasion etc. However temperature and relative humidity are two such characters that distinctly and hugely influence the physical and biochemical properties and physiology of seeds. In our work coconut seeds were stored at 10°C and 30°C for 90 days. The seeds stored at 10°C did not show any evidence of spoilage at the end of three months storage period. But the seedborns stored at 30°C showed deterioration. *Aspergillus flavus* and *Aspergillus niger* were found to be the most prominent principal fungal agents associated with the spoilage. An investigation of the proximate composition component under consideration stored at 30°C indicated some remarkable and significant results. The results and tests confirmed the ability of the isolated spoilage fungal 10 utilizes the different carbohydrate and nitrogen sources as sources of carbon and energy. *Aspergillus flavus* showed the ability to grow and utilize more of the various carbohydrate sources than *Aspergillus niger*. Both fungi showed evidence of growth and complete utilization of nearly all the nitrogen sources except cysteine, and L. Glutamine which could not support the growth *Aspergillus niger*. Like wise Cistine *niger* in addition to D-B phenylalanine could not. These results tests confirmed the ability of the isolated spoilage fungal utilizes the different carbohydrate and nitrogen sources as sources of carbon and energy. *Aspergillus flavus* showed the ability to grow and utilize more of the various carbohydratesources than *Aspergillus niger*. Both fungi showed evidence of growth and complete utilization ofnearly all the nitrogen sources except cysteine, and L. Glutamine which could not support thegrowth *Aspergillus niger*. Like wise cistine *niger* in addition to D-B phenylalanine could not support the growth of *Aspergillus Flavus*.

KEY WORDS:

Physiology, *Aspergillus niger*, *Aspergillus flavus*, Glutamine, Biochemical, Relative humidity.

INTRODUCTION:

The coconut is a crop with a large potential for varied use. It is considered to be the most important and useful among the tropical palm. Almost all the parts of coconut are useful both for domestic and Industrial purposes. Though India produces more than 15 billion nuts per annum the post harvest processing is presently confined to the production edible and milling quality of copra, coconut oil, coir and coir based products. The growth of product development and by product utilization is considerably lower in comparison with other countries like Indonesia, Thailand and Philippines. Coconut cultivation continues to be the main livelihood option as well as food and nutritional security to a large numbers of farmer families. The technology mission on coconut was launched in 2001 with the objective of making coconut cultivation and industry globally competitive. It addresses various issues in production, processing and marketing of coconut in a strategic manner coconut is essentially a crop of small and marginal farmers. It sustains the livelihood security of the dependent families in states where the cultivation is concentrated. The four southern states of Kerala, Karnataka, Tamil Nadu and Andrapradesh together account for more than 90% of the total area and production in the country. Coconut is one of the major and richest sources of vegetable oil which find application both for edible and inedible uses. This crop also supplies raw material for a number of important industries such as coir manufacture, copra processing, oil milling etc. The implementation of this mission by the Board has helped solve production constraints to a great extent and has led to development of many technologies for product diversification and by product utilization and their commercial adaptation. Coconut can tolerate and grow in saline soil. A humid atmosphere and moderate temperature are conducive for coconut cultivation. Economic life of the coconut trees usually ranges between 50–60 years.

PROCEDURE :

The Physico-Chemical characteristics studied in the current work were colour, texture, electrical conductivity, pH, dry weight, protein content, starch content, total free amino acid, total free sugar, amylase activity, and protease activity.

1. Humidity Storage

RH maintained– 60% , 70% and 80%.

Temperature maintained– 30°C +_1°C

2. Temperature Storage

Temperature maintained– 20°C+_1°C, 30°C+_1°C, 40°C +_1°C.

RH maintained–60%

OBSERVATION AND RESULTS:

1. There appeared no appreciable change in the colour of seeds when stored at 60 and 70% RH. However, at 80% RH the depth of colour was found to be increasing with prolongation of storage period.

2. There was no change in the texture for the whole period of observation.
3. The electrical conductivity of the seed increased with increase in RH level and extension of the storage period.
4. The pH of the seeds decreased from 6.8 to 6.7 on storage at 80% RH in the last two quarters.
5. There seemed loss in dry weight of the seed whose magnitude increased with increase in RH level and prolongation of the period of storage. The maximum loss was observed in the last quarter of storage at 80%RH and minimum was observed in first quarter at 60% RH.
6. The protein and starch content also gradually decreased with increase in the RH and period of storage.
7. Contrary to starch and protein, the total free amino acid and total free sugar gradually increased with increase in RH and period of storage.
8. The activity of amylase and protease gradually increased in the seed as the RH level increased and period of storage prolonged.

CONCLUSION:

High RH and temperature above the room temperature are considered adverse conditions for storage of the coconut seeds whether these harbour storage fungi or are free from them. When the seeds are infected with storage fungi, the rate of deterioration is very fast shattering the seed physiology to the extent of ravishing seed germination to the maximum such changes have not been observed in the stored seeds free from the storage fungi as they are not influenced by enzymes and toxins produced by the storage fungi. Still the fungus free seeds face adversity of uncongenial temperature and RH of the storage. After analysis moulds isolates were identified as *Aspergillus niger* and *Aspergillus flavus* using morphological and colonial characteristics described by Barrett and Check. The storage decreases the ascorbic acid content of the samples and concentrated the quantity of other nutrients that are not affected by moisture loss, which may include the fat content (Fox and Cameron). An investigation of the proximate composition of the sample stored at 30°C indicated a marked significant difference in the percentage composition of moisture, protein, ascorbic acid and carbohydrate content of 3.97 ± 0.28 , 3.98 ± 0.07 , 0.01 ± 0.002 and 9.27 ± 1.02 respectively as against 46.82 ± 0.43 , 37 ± 0.5 , 2.48 ± 0.15 and 11.89 ± 0.22 obtained at 10°C prior storage.

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